

MONTHLY WEATHER REVIEW.

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The MONTHLY WEATHER REVIEW summarizes the current manuscript data received from about 3,500 land stations in the United States and about 1,250 ocean vessels; it also gives the general results of the study of daily weather maps based on telegrams or cablegrams from about 200 North American and 40 European, Asiatic, and oceanic stations.

The hearty interest shown by all observers and correspondents is gratefully recognized.

Acknowledgment is also made of the specific cooperation of the following chiefs of independent, local, or governmental services: R. F. Stupart, Esq., Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. I. S. Kimball, General Superintendent of the United States Life-Saving Service; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Director Meteorological Office, London; Maxwell Hall, Esq., Govern-

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As far as practicable the time of the seventy-fifth meridian is used in the text of the MONTHLY WEATHER REVIEW.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e., apparent gravity at sea level and latitude 45°.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

A barometric depression that past west of Luzon, Philippine Islands, about May 26, apparently advanced thence on a northerly course over or near the Japanese Islands, where its presence was indicated June 1 and 2.

In the United States June opened with high barometric pressure and low temperature for the season over the north-central valleys, the Lake region, and the Middle Atlantic and New England States. To the westward of the high area there was a barometric depression that covered the Rocky Mountain and Plateau districts. This depression drifted slowly eastward to the north Atlantic coast by the 9th, attended in the interior States east of the Rocky Mountains by heavy rains, and in localities in the middle-west and north-central valleys by severe local storms.

On the 9th the following special forecast was issued:

There are no present indications of unseasonably high temperature in any part of the United States. In the Middle-Eastern and Northeastern States the weather of the next three days will be generally fair, with moderate temperature. A barometric depression that will appear over the Rocky Mountain districts Wednesday will move slowly eastward over the Plains States Thursday, cross the central valleys Friday and Saturday, and reach the Atlantic coast Saturday or Sunday. Local rains and a slight rise in temperature will attend the advance of the low area, and following its passage there will be a day or two, the beginning of next week, of somewhat lower temperature from the north-central valleys to the middle and north Atlantic coasts.

From the 10th to the 15th a barometric depression moved from the Rocky Mountain districts to the Atlantic coast, attended by rains that in parts of the Middle-Western States were heavy. In the Middle Atlantic and New England States the rain of the 15th relieved a dry spell that was becoming serious. An area of high barometer that appeared over Bering Sea on the 10th advanced over the British Northwest Territory by the 12th, covered the Missouri Valley on the 13th and 14th, the upper Mississippi Valley and the western Lake region on the 15th, and reached the Atlantic coast on the 16th, attended by fair and cooler weather that continued over the eastern districts several days.

On the 15th the following special forecast was issued:

The period of persistent heavy rains of the last two weeks that has caused destructive floods in the Middle-Western States will end by Thursday. Temperature will rise in the Plains States and central valleys after Tuesday, and the warmer weather will reach the Atlantic States about the close of the week. Next week will open warm over the eastern portion of the country.

Local rains will occur over the Plains States Tuesday, in the central valleys and Lake region Wednesday and Thursday, and reach the Atlantic States by Saturday.

The heavy rains of the Middle-Western States practically ceased Thursday. Following the termination of the rain period the first well-defined warm wave of the season set in over the interior districts and extended to the Atlantic seaboard by the close of the week.

On the morning of the 22d the following forecast was issued:

The warm wave that now covers the country generally east of the Rocky Mountains will break over the Plains States Tuesday, over the Mississippi Valley and the western Lake region Wednesday, in the Ohio Valley and eastern Lake region Wednesday night, and over the Atlantic States Thursday. Local rains and thunderstorms will attend the advent of the cooler weather in the several sections named. Moderate temperatures will be experienced over the eastern portion of the country during the closing days of the week.

This warm wave was of unusual intensity and duration for the season and it terminated in the several districts as indicated in the forecast. As indicated also by the forecast, the temperature over the eastern portion of the country was moderate during the closing days of the week ending June 27.

During the last five days of the month a barometric depression advanced from the Rocky Mountain districts to the Atlantic coast, preceded by temperatures above the seasonal average and attended in the middle and northern districts by local rains and thunderstorms that in localities were heavy. This depression was followed by cooler weather thruout the interior of the country that reached the Atlantic seaboard at the close of the month.

The Paterson, N. J., Press, of July 3, has the following edi-

torial regarding a forecast issued by the Weather Bureau at Washington on June 29:

The Weather Bureau's prediction made on Monday last that there would be a break in the warm wave on Thursday evening came true and was a splendid exhibition of what might be called "long-distance predicting." The sudden change from the almost unbearable heat and humidity that prevailed during the day was most agreeable and invigorating. The heavy shower aided materially in bringing about a more comfortable condition of affairs.

BOSTON FORECAST DISTRICT.*
[New England.]

The month as a whole was warm and dry, and at the close the drought was being severely felt in all sections. There were no high winds or gales on the coast and no storm warnings were issued.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.*
[Louisiana, Texas, Oklahoma, and Arkansas.]

The month was warm and precipitation was deficient over the greater portion of the district. No general storms occurred on the west Gulf coast and no storm warnings were issued.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.*
[Kentucky and Tennessee.]

Temperature averaged about normal, and, except in scattered localities, precipitation was somewhat below normal. The greater portion of the rainfall occurred in the first decade of the month.—*F. J. Walz, District Forecaster.*

CHICAGO FORECAST DISTRICT.*
[Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, and Montana.]

Temperature conditions were unimportant. Rainfall was above normal practically over the whole district, the excess being the most decided in the middle Missouri Valley. The rains were as a rule successfully forecast. Storm warnings were issued on the morning of the 19th, and the warnings were verified at a majority of the Lake stations. Frost warnings were issued for the lowlands of Michigan and Wisconsin on the 1st, 9th, 10th, 11th, and 14th. Freezing temperature was reported in the cranberry marshes of Wisconsin on four of these dates, and in portions of Michigan on two. The cranberry marshes were flooded, and damage from frost was consequently averted.—*H. J. Cox, Professor and District Forecaster.*

DENVER FORECAST DISTRICT.*
[Wyoming, Colorado, Utah, New Mexico, and Arizona.]

The mean temperature was considerably lower than usual, except in south-central Colorado. Precipitation was in excess in the northwestern half and deficient in the southeastern half of the district. In south-central Colorado the long-standing drought was unbroken.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.†
[California and Nevada.]

The month was one of continued cool weather and, until the last week, the usual summer afternoon high temperatures were missing. In Nevada unsettled weather continued until the middle of the month. The only coast disturbance appeared on the 20th. Southwest storm warnings were displayed and verified.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.†
[Oregon, Washington, and Idaho.]

As usual June was a quiet month. Temperature was unusually low in eastern Oregon and southern Idaho. There was a marked excess in rainfall in southern Idaho and a marked deficiency in the Willamette Valley and the Sound country. No wind storms occurred.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

As has been frequently remarked, June is preeminently a month of floods, and those of the present month so far exceeded the majority of their predecessors in extent or duration, or both, that they are entitled to take front rank with the great floods of 1844, 1897, and 1903. They were probably not quite so great when measured by actual water stages as the floods of these former years, but they were equally if not more extensive, and were doubtless greater if measured by their duration and by the amount of losses and damage sustained.

At the end of the month several of the rivers of the Mississippi watershed, including the lower Mississippi, were still in flood. A number of special reports have not been received and it is therefore thought best to postpone for another month the description of these floods. Another report that will also appear at a later date is one on the annual rise of the Columbia River for the year 1908.

The Trinity River of Texas continued in flood thruout its entire length during the month, and it did not fall below flood stage until July 5. The crest of the Brazos River flood reached Booth, Tex., on June 6. A report of this flood covering essential points was included in the MONTHLY WEATHER REVIEW for May, 1908. The crest stages of the Trinity River from Long Lake to the mouth were the highest on record, especially at Long Lake, where the maximum stage of 51.8 feet, 16.8 feet above flood stage, occurred on June 4.

Heavy rains during the first few days of the month over the northern Rocky Mountain districts were followed by destructive floods in all streams of western Montana, eastern Idaho, and northern Wyoming. No river and flood service is maintained on those rivers and detailed reports are therefore not available. The losses and damage, while very large, were of the usual character, with the railroads as the greatest sufferers.

East of the Mississippi River there were no floods during the month, except in some of the smaller streams of New York, where heavy rains about the middle of the month did much damage. The Ohio River was at moderate stages thruout the month.

The highest and lowest water, mean stage, and monthly range at 213 river stations are given in Table IV. Hydrographs for typical points on seven principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*

* Morning forecasts made at district center; night forecasts made at Washington, D. C.

† Morning and night forecasts made at district center.

SPECIAL ARTICLES, NOTES, AND EXTRACTS.

A GRADUATE SCHOOL OF METEOROLOGY.

The Association of American Agricultural Colleges and Experiment Stations has adopted one of the wisest plans conceivable for the increase and diffusion of sound knowledge relative to agriculture, i. e., the establishment of a graduate or post-graduate school, in which lectures and experiments by experts and specialists bring home to interested audiences the present

state of our knowledge, the trend of current thought, and the outlook for the future.

The third session of this school was held at Ithaca under the auspices of the New York Agricultural Experiment Station, July 6-31, 1908. The program shows that the instructors and students were kept very busy with their lectures and seminars; the latter are nearly equivalent to the laboratory work of the botanical, physical, and chemical laboratories, in